








DEPARTMENT OF STATE HEALTH SERVICES

RAM Incidents and Investigations
Chris Moore

Outline

-  Incident Investigation Program
-  Incidents and Complaints Statistics
-  Trends in Incidents and Complaints
-  Incidents and Complaint Cases
-  Reporting Requirements

Who is IIP?

Environmental Monitoring Group

Robert Free, Manager, Environmental Monitoring

Full - Time Investigators:

- Karen Blanchard
- Irene Casares
- Gentry Hearn
- Chris Moore
- Art Tucker

Definitions of the Types of *IIP* Investigations

Incident Investigations

Loss of control of sources of radiation that causes, or threatens to cause, or creates a hazard to health and/or the environment.

Complaint Investigations




Allegations of unsafe or perceived unsafe conditions involving radiation.

Technical Assistance

Assistance provided to members of the public/companies/state and local government upon request to address radiological concerns.

Emergency Response Hotline

512-458-7460

-  Answered by DSHS staff during normal working hours.
-  Answering service provides back-up during normal hours and after hours answering service.
-  DSHS Health Physicist-on-call contacted within minutes using call down list.

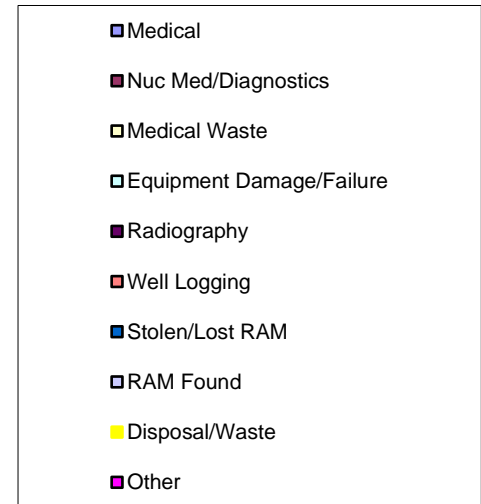
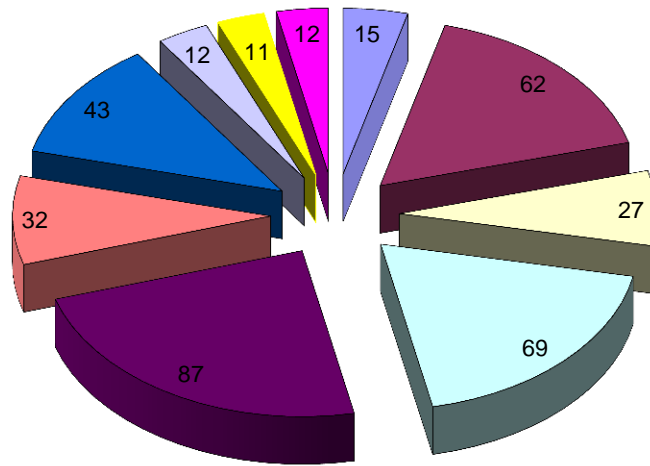
Incidents

(other than emergencies)

- ☢ Field staff available for rapid response.
- ☢ Reports received in central or regional office.
- ☢ Reviewed and investigated by central office or field staff.
- ☢ May request inspection or assistance from Inspector.

Incident Statistics

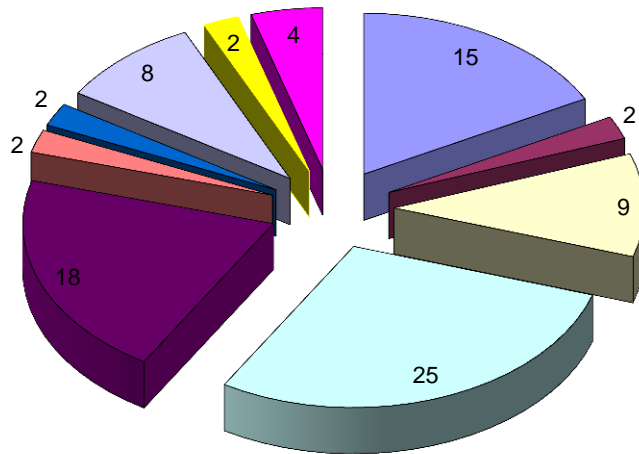
Fiscal Year 2011-2014 Incidents (370 total)



Medical	15
Nuc Med/Diagnostics	62
Medical Waste	27
Equipment Damage/Failure	69
Radiography	87
Well Logging	32
Stolen/Lost RAM	43
RAM Found	12
Disposal/Waste	11
Other	12
Total	370

Complaint Statistics

Fiscal Year 2011-2014 Complaints (87 total)



- Radiation Exposures
- Equipment
- Radioactive Material Control
- Radiography Violations
- NORM
- Well Logging
- Medical
- Nuclear Medicine
- Admin/Training
- Other

Radiation Exposures	15
Equipment	2
Radioactive Material Control	9
Radiography Violations	25
NORM	18
Well Logging	2
Medical	2
Nuclear Medicine	8
Admin/Training	2
Other	4
Total	87

Trends

- ☢ First Responder pagers
- ☢ Increased monitoring at waste/recycling Sites
- ☢ NORM contamination
- ☢ Medical waste
- ☢ Radiography field operations
- ☢ Lost moisture density gauges

Law and Fire Radiation Pagers

- ☢ Increased use and detection
- ☢ Common to detect radiography operations (2 mr/hr issue)
- ☢ Identification
- ☢ DSHS Support



Police Department Pager Incident #1

On November 20, 2012, the Fort Worth EMC notified the Agency that a police officer's personal radiation detector had alarmed in a privately-owned parking lot in downtown Ft. Worth. Following the alarm, the EMC had used a radiological isotope identifier and identified the material as radium-226.

Incident #1 cont,

- ☢ A hole was dug through the asphalt and the radiation readings jumped to 200 millirem/hour at near contact with the dirt under the asphalt.
- ☢ Site of old hospital, still under investigation.






Police Department Pager Incident #2

- ☢ Houston Metro Transit Authority reports 800 mr/hr near train station which is near a building used to conduct radiography.
- ☢ Value is not reasonable at 50 feet away from the building.
- ☢ Deployed an investigator.
- ☢ There has been no less than four calls about this facility from Fire and Law Enforcement.




NORM Contamination

- ☢ Several case where pipe and tanks cut up for recycling and shipped to India and China.
- ☢ Recycling operation on leased property with insufficient precautions to prevent soil contamination.
- ☢ In one case, the company moved and left the soil contaminated at levels as high as 200 pCi/gram of Ra-226 with elevated background levels. The case still in enforcement.



NORM Exposure

-  Concentration of NORM during Iodine removal from oil and gas wastewater.
-  Plant and filters cleaned resulting in concentrated sludge in over 50 barrels at 8-10 mrem/hr. No license to clean up nor monitoring of workers.
-  Multiple workers exposed for 10 days in a 2-10 mrem/hr area. Three violations cited.

Department of Transportation (DOT) Exemptions

-  In most cases the rejected material is NORM, Radium-226.
-  The Agency issues about 160 DOT exemptions a year.
-  Many other facilities are not requesting DOT exemptions.

Increased Monitoring at Waste and Recycling Sites

-  Recycling – typically Ra-226 from oil and gas piping but not always Naturally Occurring Radioactive Material (NORM).
-  Waste – typically I-131 hospital waste that was not segregated or residential human and cat waste.

Increased Medical Waste identified at Waste and Recycling Sites

- ☢ 27 Medical Waste incidents over the last 4 years, many at landfills or companies that take medical waste (Stericycle).
- ☢ Waste – typically Tc-99, I-131 or other short lived material from hospital waste that was not segregated. This is a level 4 violation but repeated violations will result in enforcement and fines.

Radiography Violations

- ☢ Violations occur from incidents, complaints, unannounced field inspections.
- ☢ Often unrelated violations found during investigation of complaints and incidents.
- ☢ 42 unannounced field inspections (Special Projects) resulted in violations cited 69% of the time. A total of 150 violations were recommended for licensees and radiographers.

Radiography Issues

- ☢ Lack of trainee supervision. Trainer in back of truck with door shut or sitting in front.
- ☢ Numerous trainee errors due to lack of oversight. Several times the trainee improperly connected the drive cables resulting in source disconnects.
- ☢ Post exposure surveys failed to be conducted. This is often the last line of protection from overexposure.
- ☢ Neither worker on a two-man crew has eyes on camera.

Lost Moisture Density Gauges

- ☢ Routinely the gauges are thrown in the back of the pickup.
- ☢ Tailgate is left down.
- ☢ Gauge is not locked.
- ☢ Gauge is not stored in box that has two chains to secure to the vehicle.
- ☢ Gauge inside box must be secure for transportation IAW DOT rules. DSHS recommends brackets.



Incident and Complaint Cases

Public Exposure

On December 11, 2013 an incident occurred at a facility involving industrial radiography. A radiographer and foreman approached a pressure vessel to check and discuss film position.

While walking away from the vessel and camera, the radiographer kicked the crank out mechanism and realized the source was still in the collimator. The crew was using a 67 curie iridium-192 source in a SPEC-150 camera.

The radiographer reported that he touched the collimator for approximately 10 seconds, which resulted in a calculated dose of 9.88 rem to his hand. The calculated whole body doses were 2.06 rem for the radiographer and 515 millirem for the foreman. The radiographer and the site foreman were evaluated at medical facilities. The licensee terminated the radiographer's employment and retrained all other personnel on policy and procedures. Four violations were cited.

Lost 134 microcurie Iridium-125 Seed

A two seed treatment was conducted on March 17, 2014. On March 18, a specimen with the seeds was removed from the patient. The specimen was surveyed and verified to have radioactive material, but the activity was not verified.

The licensee removed one seed from the specimen and placed it in a lead container. The patient was surveyed to verify all seeds were removed. The technician stated he surveyed the specimen and found no activity.

On March 19, the specimen was radiographed and a single small rod shaped metal object was seen in the specimen. The individual looking at the slides of the specimen decided the metal object was a metal clip. The specimen was then processed for slide blocks which required large quantities of water.

On March 24, an inventory of the iodine seeds indicated one of the seeds was missing. The licensee conducted a search of the treatment area for the missing seed. A radiologist and a surgeon reviewed the slide of the specimen and determined the metal rod in the specimen was in fact the second seed.

Lost Seed

The licensee believes the seed was lost down the drain when the specimen was being prepared to make the slides.

The licensee surveyed the slide preparation area and the drain system several times in an attempt to locate and recover the source. The source was not located. No exposure to members of the general public is likely due to this event. No individual would have received a significant exposure to their hand during the preparation of the slides.

Personnel who perform this procedure received additional training to prevent recurrence of this type of event. The licensee's notification procedure was modified to require immediate notification to the radiation safety group for this type of event. The licensee was cited for one violation.

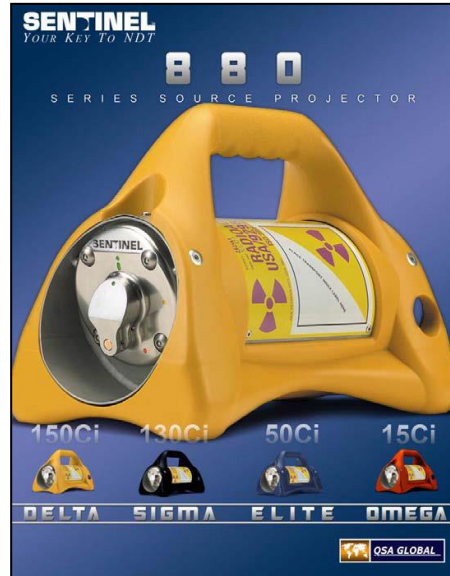
Stolen Radiography Camera

On July 19, 2011, a radiography crew staying at a hotel in Austin discovered that the dark room on their truck had been broken into some time during the night. A QSA Global model 880 D radiography camera with a 33.7 curie iridium 192 source was missing.

Local law enforcement was contacted and responded to the scene. State, federal, and local government agencies were notified of the theft.

During the investigation of the event, it was discovered that one of the radiographers had failed to reset the darkroom door alarm when he last left the truck. The radiographer and the licensee were each cited for a violation.

Stolen RAM



Dose Assessments

33.7 Curies of Ir-192

Dose on contact (shielded) was 21 millirem per hour.

Dose at 1.0 meters unshielded 16 rem per hour. At 1 foot, LD 50/30 in 3 hours.





Agency Collaboration



NATIONAL GUARD 

6 CST

Licensee's Response

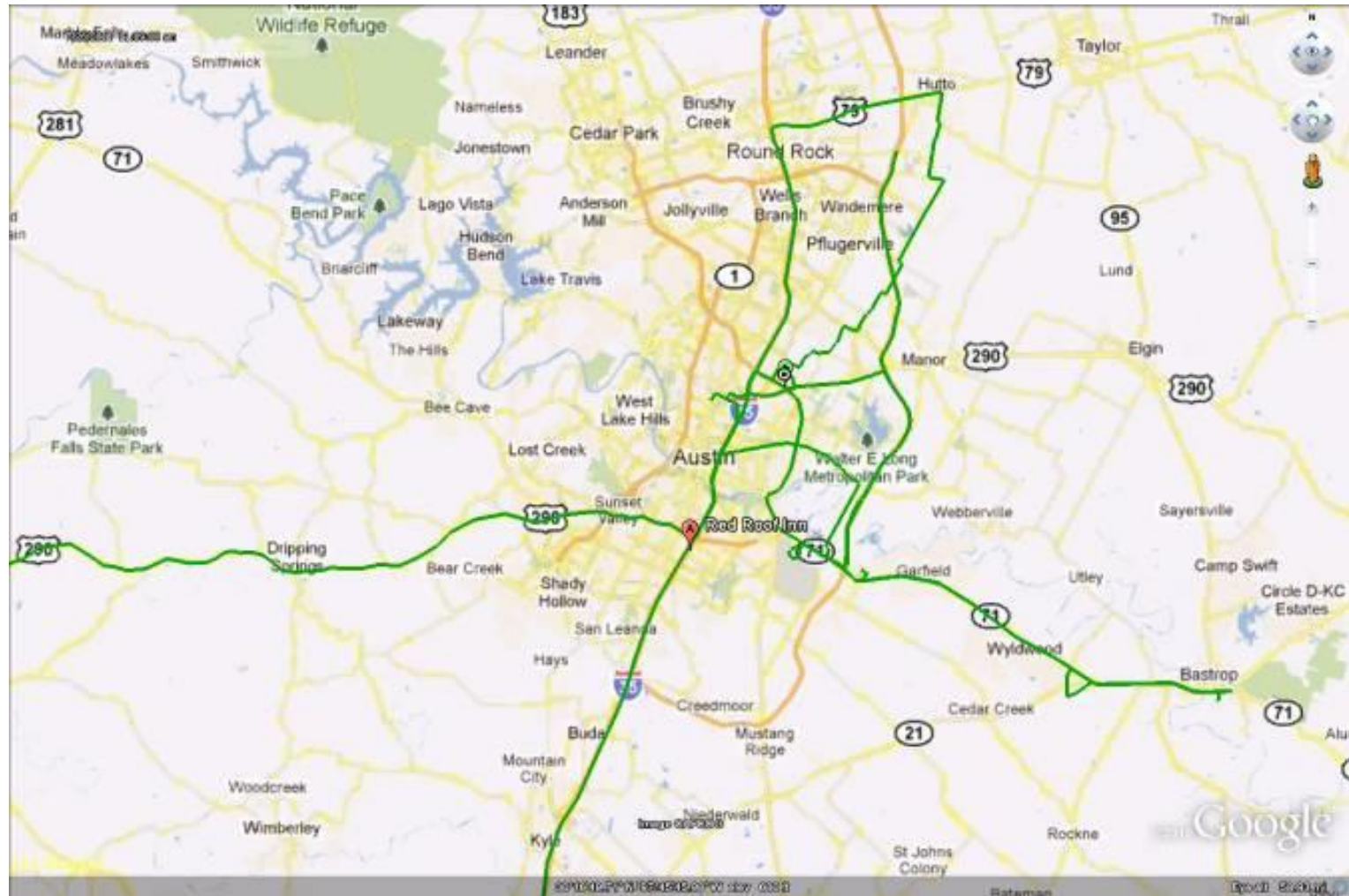
-  Performed searches with portable instruments.
-  Reviewed security tape.
-  Reward offered.
-  Search local pawn shops/flea markets.

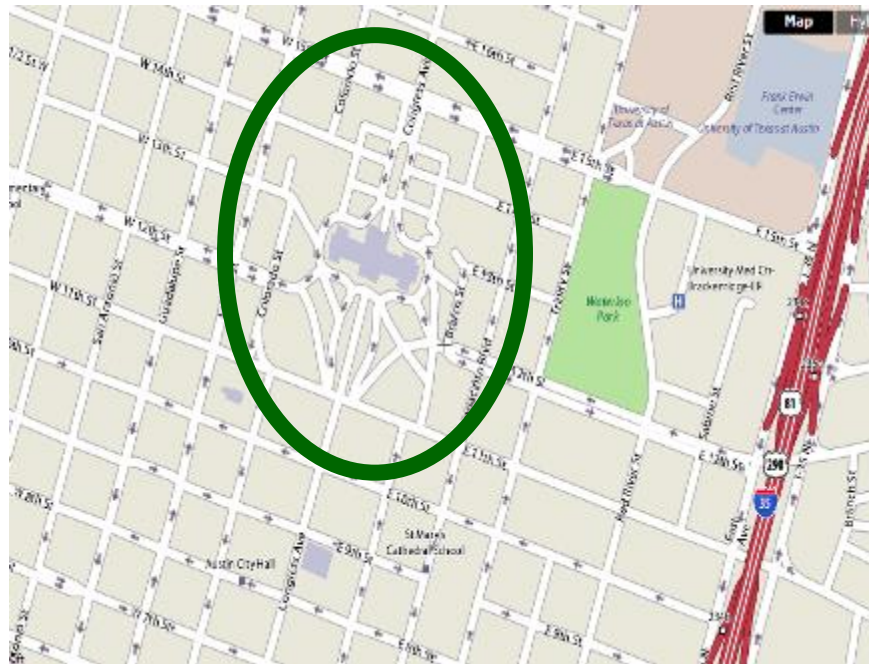
DSHS Response

- ☢ Inspectors instructed to use portable survey instruments when driving to inspections.
- ☢ Assist in search of area.



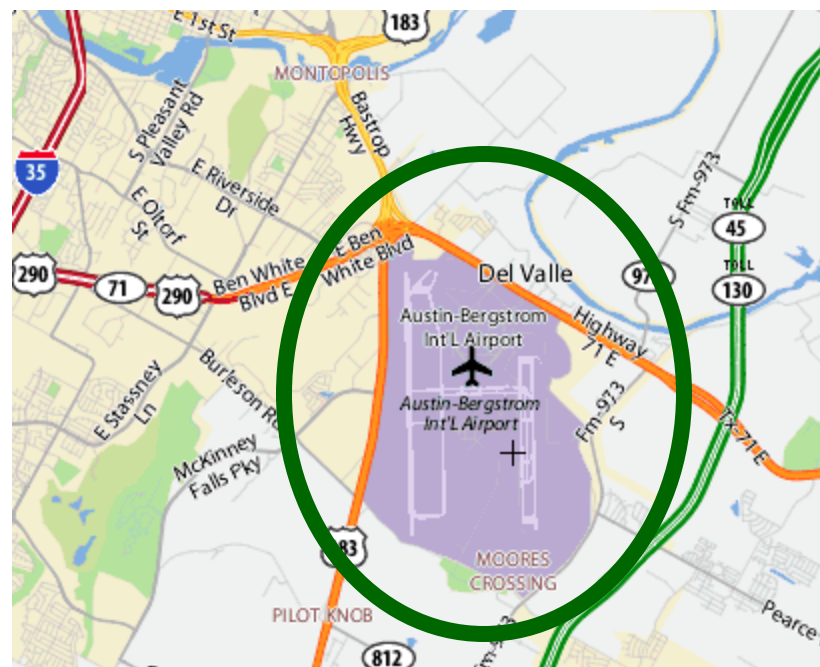
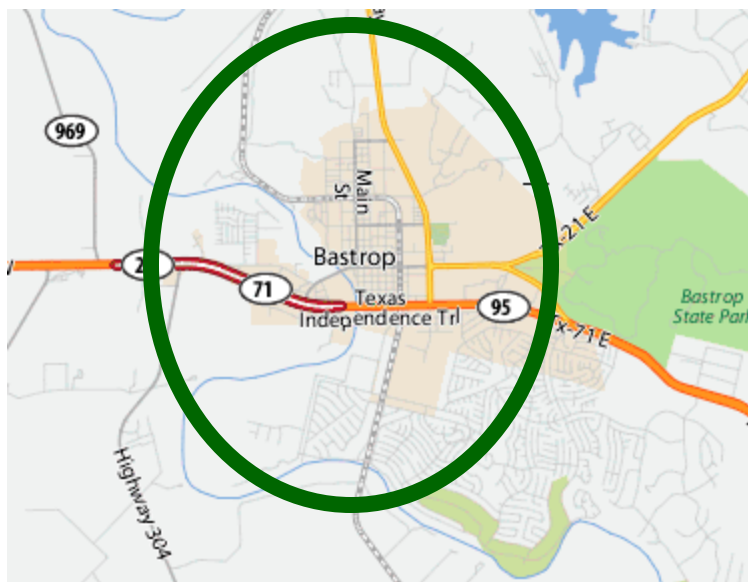
Areas Surveyed





DSHS Focused Surveys:

- Capitol Area
- Airport
- Bastrop









6th Civil Support Team



- Vehicular Monitoring
 - 16" Sodium Iodide Detector

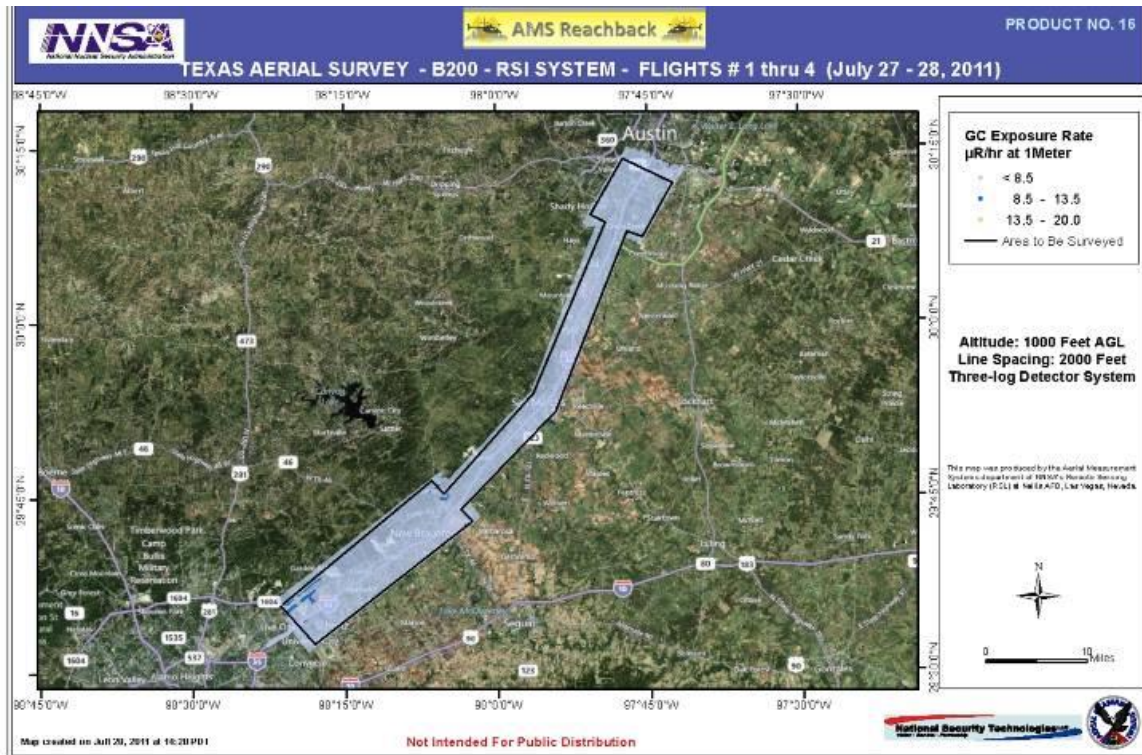
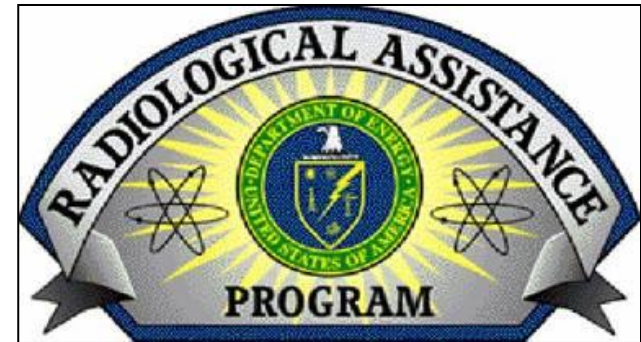


Notifications

-  Texas Association of Pawn Brokers
-  Institute of Scrap Recycling Industries Inc.
-  Texas Landfill Operators
-  TXDOT - Mowing
-  City of Austin - Mowing
-  Texas Radiography Licensees

Week 2 Activities

- FBI
- DOE Fixed Wing “Sweep”





Week 2 Activities

- APD Helicopter with 6th CST 16" Sodium Iodide Detector







Week 2 Activities

-  Agency notified other state programs including Oklahoma, Louisiana, Florida, Alabama, New Mexico, Arkansas, Georgia, and Mississippi.
-  NRC notified Pennsylvania.

Enforcement - Licensee

- ☢ Administrative penalty
- ☢ Retrained staff on security
- ☢ Audited security systems on all trucks
- ☢ Hired 3rd party to do field audits
- ☢ Installed GPS devices on cameras

Enforcement - Radiographer

-  Administrative penalty
-  Retrained on security by licensee
-  Gave presentation at safety meeting
-  Probation

Well Logging Case National News

Licensee lost a 15 curie americium -241/ beryllium source . The source had been used earlier that day at a well site near Pecos, Tx. The well logging crew left the Pecos site and drove 130 miles to a well south of Odessa. When the crew went to remove the source they discovered the source transport container lock and plug were not in place and that the source was missing. Searches along the route traveled by the licensee's vehicle were conducted by DSHS, 6th CST, and the EPA's Airborne Spectral Photometric Environmental Collection Technology airplane. The source was not recovered. 24 days after the source was lost it was found by a member of the general public. The individual stated that he found the source at a location 8 miles from the well site where the licensee had been working in the opposite direction from the path driven by the crew.



Well Logging Case



- Maintenance issues (pig and storage container)
- Stripped threads in the pig to store the source.
 - One bolt to hold down the pig was missing allowing it to pivot.
 - Lock and pin on pig broken.



- Inexperience crew members
- Person conducting surveys had only done it a few times and was new to the crew.
 - Person handling the well logging transfer tool had only done it a few times.
 - The most experienced crewmember who typically handled the source was off for the day.



Import Case

The Agency was notified that tissue box covers had been shipped to Bed Bath & Beyond (BB&B) stores located in the United States that were contaminated with **cobalt-60**. Four stores in the State of Texas were identified as receiving a shipment of these boxes. Surveys of the tissue boxes at each location were conducted by the Agency. Readings as high at **27 mr/hr** found at each location on at least one of the boxes. The boxes have been removed from the shelves and the company has made arrangements to dispose of the boxes. The Agency confirmed that all of the tissue boxes that were located in Texas had been delivered to the smelter for destruction.

**BED BATH &
BEYOND®**

Crazy or Not?

☢ A man stated while being locked up multiple times, the police were inserting radioactive material into his personal property including the eagle eye on a Mexican Peso.




☢ A woman reported that her radioactive granite countertops were making picture images move and had spread to her SUV. She refused to drive her vehicle.

☢ A woman reported a nuclear explosion in Houston that was plutonium because of the humming noise. She knows people in her neighborhood have been poisoned with plutonium because their faces appeared smashed, like they have been put into a press.

☢ The employee at a plastic pipe facility detected radiation on his own meter, uploaded lots of videos to You Tube, and scared most of the employees. He stated he was getting sick for 6 months. In this case, radiography crew next door had changed their camera locations resulting in over 100 mrem/year in some areas of the pipe facility.

Reporting Requirements

Phone Reporting Requirements

-  Events in which require immediate or 24 hour notification. For medical events, the next calendar day.
-  Phone notifications – use the 24 hour Radiological Emergency Assistance Number (512) 458-7460.
-  Leaving a message for a DSHS investigator or sending an email will not count for initial reporting requirements of state regulations.

Example: §289.202(xx)(8)(A)

To the extent possible:

- (i) the caller's name and call back telephone number;
- (ii) a description of the event, including date and time;
- (iii) the exact location of the event;
- (iv) the isotopes, quantities, and chemical and physical form of the radioactive material involved; and
- (v) any personnel radiation exposure data available.

Example of what to include in a Follow-up Equipment Written Report

-289.202(xx)(8)(B) and (C)- The Agency recommends you write up a report addressing in order all requirements that must be included in the report:

- (i) a description of the event, including the probable cause and the manufacturer and model number (if applicable) of any equipment that failed or malfunctioned;
- (ii) the exact location of the event;
- (iii) the isotopes, quantities, and chemical and physical form of the radioactive material involved;
- (iv) date and time of the event;
- (v) corrective actions taken or planned and the results of any evaluations or assessments; and
- (vi) the extent of exposure of individuals to radioactive materials without identification of individuals by name.

Example of what to include in a Follow-up Medical Written Report

-289. 256 (uuu)(4) The licensee shall submit a written report to the agency within 15 calendar days after discovery of the medical event. The written report shall include the following, excluding the individual's name or any other information that could lead to identification of the individual:

- (A) the licensee's name and radioactive material license number;
- (B) the name of the prescribing physician;
- (C) a brief description of the medical event;
- (D) why the event occurred;
- (E) the effect, if any, on the individual(s) who received the administration;
- (F) actions, if any, that have been taken, or are planned, to prevent recurrence; and
- (G) certification that the licensee notified the individual (or the individual's responsible relative or guardian), and if not, why not.

Written Reports

- ☢ 15 day and 30 day written reports must be submitted on time or another violation will be issued.
- ☢ You may not have all the final details for the report so submit an update later with remaining reportable information.
- ☢ PDF via email with follow-up mailed copy is preferred.

Questions

Contact Information

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